Global Sustainable Buildings Guide - Singapore

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*This chapter was last reviewed in May 2024.*

# Authors

# Green Certification

## Is there a nationally adopted and recognized form of certification for buildings? What is it and is it mandatory for all new buildings and refurbished buildings?

**Introduction and background to Singapore's Green Mark certification**

The Building and Construction Authority (BCA) is the government agency overseeing safety, quality, inclusiveness, sustainability and productivity of the built environment sector in Singapore. Tasked by the government to champion the green building environment,1 the BCA introduced the Green Mark certification scheme in 2005. This rating system promotes the adoption of green building designs and technologies that improve energy efficiency and reduce buildings' impact on the environment.2

Collaborating with the building industry and other relevant stakeholders, the BCA launched the first Green Building Masterplan in 2006 to increase industry efforts in environmental sustainability, with the focus on "greening" new buildings.3

In 2009, the BCA launched the [second Green Building Masterplan](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/2nd_green_building_masterplan.pdf?sfvrsn=d9da2e13_0), emphasizing the greening of existing buildings for which a major energy-use change has been proposed or that have undergone a major energy-use change. For the purposes of the Building Control Act 1989 and the [Building Control (Environmental Sustainability Measures for Existing Buildings) Regulations 2013](https://sso.agc.gov.sg/SL/BCA1989-S383-2013?DocDate=20220705) ("**2013 Regulations**"), a "major energy-use change"4 in relation to an existing building means either of the following:

The installation, substantial alteration or replacement of a prescribed cooling system (water-cooled chiller or air-cooled chiller5) of the building

Any other change to the energy requirements of the building that may be prescribed

For the latest Green Mark: 2021 certification,6 the definition of "major retrofitting" includes the statutory and regulatory definition above and also any of the following:

Addition or replacement of chiller(s)

Addition or replacement of 50% or more of all air-conditioning condenser units or, if adding or replacing air-conditioning condenser units, 50% or more of the currently installed capacity

Additional gross floor area of 5,000 square meters (m2) or more

Developers and owners of new and existing buildings, districts, parks, infrastructure, and building interiors are assessed on the following five key criteria:7

Energy efficiency

Water efficiency

Environmental protection

Indoor environmental quality

Other green and innovative features that contribute to better building performance

The process for applying for Green Mark certification involves several stages and an on-site inspection.

At application: When paying a fee, applicants must provide detailed information on the design and construction of the project, including engineering calculations and material/equipment specifications.

For verification: Applicants must supply other information, such as purchase/delivery orders.

At assessment: The BCA assessors will visit the site for a detailed assessment.8

When first introduced, the Green Mark assessment — based on scoring, performance levels and evidence collection — determined the Green Mark rating series:

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| **Green Mark rating** | **Score** |
| Certified | From 50 to 70 |
| Gold | From 70 to 80 |
| GoldPLUS | From 80 to 90 |
| Platinum | 90 and above |

From 1 January 2024, all new builds and existing buildings with major retrofitting will be assessed under the refreshed standards and technical guides of the Green Mark: 2021 second edition. The BCA describes this latest certification framework9 as follows:

Simple: Many prerequisites of the first edition standards and technical guides have been removed, and the criteria have been restructured into two broad categories:

Energy efficiency (the only prerequisite)

Sustainability sections covering intelligence, health and well-being, whole-life carbon, maintainability and resilience

Sustainable:

Criteria are mapped to the [United Nations Sustainable Development Goals](https://www.un.org/sustainabledevelopment/sustainable-development-goals/) and contextualized for implementation within the built environment in Singapore and the urban tropics to push the energy efficiency envelope so as to mainstream Super Low Energy (SLE) buildings.

This recognizes future requirements from various sustainable finance taxonomies.

Smart: This recognizes digitalization efforts to facilitate easy, seamless, and secure certification processes.

Owner-friendly: This recognizes building developers' and owners' needs for sustainable operations and environmental, social and governance reporting and demonstrating their leadership.

Cost-effective: This increases sustainability with a value-driven approach, including environmental value, social value and economic value based on a life-cycle cost approach.

User-friendly: This is a robust yet flexible framework that brings all buildings into the same ecosystem of Green Mark: 2021.

Green Mark: 2021 aims to raise standards in energy performance and place greater emphasis on other sustainability outcomes:

Designing for maintainability

Reducing embodied carbon across a building's life cycle

Using smart technologies

Enhancing a building's resilience to climate change

Creating healthier environments for building users10

For previously Green Mark certified buildings not undergoing a retrofit, building owners can apply for a streamlined [certification process](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/20211001_gm2021-in-operation_locked.xlsm) "Green Mark: 2021 In Operation" to maintain the previous Green Mark rating or upgrade the rating based on the energy efficiency performance.

Under the Green Mark: 2021 assessment, which introduces a new Green Mark rating series, project teams have the option to pursue either or both of the following series:

Green Mark GoldPLUS or Platinum certification, which are comprehensive certifications that cover various aspects of sustainability

Green Mark SLE certification, which is focused solely on energy efficiency

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| **Green Mark series** | **Energy efficiency savings** | **Overall requirements** |
| SLE | Up to 60% | Top-tier energy efficiency built on a high environmental performance foundation |
| GoldPLUS/Platinum | From 50% to 60% | Addressing climate change with a best-in-class holistic environmental performance    Includes various aspects of sustainability |
| GoldPLUS/Platinum + SLE | 60% and over | The peak green building performance    Includes various aspects of sustainability |

Each subsequent iteration of the Green Building Masterplan (the latest edition summarized below) increases and progresses certification standards. Compliance with the Green Mark: 2021 certification is voluntary. It recognizes performance that is above mandatory, regulated standards, and includes robust levels of energy efficiency, indoor air quality, greenery provision, active mobility considerations, materials and waste management, and water efficiency.

However, developers and owners of prescribed new buildings or retrofitted existing buildings that meet the building size requirements (or are projects on government land sale (GLS) sites) must comply with the minimum standards set out in the codes for new and existing buildings under retrofit, including achieving the minimum Green Mark score, that are mandated by statute and regulations, as summarized below.

**New buildings**

For developers of new buildings, the [Building Control (Environmental Sustainability) Regulations in 2008](https://sso.agc.gov.sg/SL/BCA1989-S199-2008?DocDate=20220705) ("**2008 Regulations**") require new builds of all building types11 with a gross floor area (GFA) of 5,000 m2 or more12 to achieve a minimum Green Mark certification.13 The 2008 Regulations require these new builds14 to achieve a minimum score of points as set out in the [Code for Environmental Sustainability of Buildings](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/es-code_reg-2008_edition-4-0.pdf), which establishes environmentally friendly practices in planning, design and construction to mitigate the environmental impact of such structures. All new buildings must be 50% more energy efficient than the 2005 baseline.

**Refurbished buildings**

The [Building Control Act 1989](https://sso.agc.gov.sg/Act/BCA1989) was amended in 201215 to mandate building owners to achieve higher energy efficiency when undertaking a "major energy-use change"16 for the building, prescribed under the 2013 Regulations.

The types of buildings initially subject to achieving a minimum Green Mark certification were large hotels, retail buildings, and office buildings with a minimum GFA of 15,000 m2.17 The 2013 Regulations were amended in 201718 with the latest prescribed buildings extended to include all single-use and mixed-use buildings with a GFA of 5,000 m219 that install or replace their building cooling system.

Part 3B of the Building Control Act 1989 on environmental sustainability measures for existing buildings requires owners of existing buildings (except for types A and B) to do the following:

Comply with the minimum Green Mark environmental sustainability standard

Submit periodic energy efficiency audits of the building's cooling systems

Submit information in respect of energy consumption and other related information as required by the commissioner of building control (CBC)

The buildings exempt from the requirements of Part 3B of the Building Control Act 1989 are classified as either of the following:

Type A buildings used as the following:

Data center20

Religious building

Residential building (other than serviced apartments)

Utility building

Type B buildings used as follows:

As an industrial building, an industrial retail building, a light industrial building, or a special industrial building21

As railway premises

To provide airport services and facilities22

To provide port services and facilities23

The 2013 Regulations also require all prescribed buildings to achieve a minimum score of points set out in the [Code on Environmental Sustainability Measures for Existing Buildings](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/esm-code_reg-2013_edition-3-0.pdf), which establishes environmentally friendly practices in the operation and retrofitting of existing buildings. The building energy performance must be optimized to meet the minimum energy improvements of 40% over the 2005 baseline when retrofitted.

**Green Building Masterplans**

The BCA has continuously updated its Green Building Masterplan since its inception in 2006, and the latest [Singapore Green Building Masterplan 2021 (updated in July 2022)](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/20220726_singapore-green-building-masterplan-booklet.pdf?sfvrsn=151fba03_8) sets out the built environment sustainability standards to achieve the BCA's [low-carbon target of 80-80-80 in 2030](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/sgbmp-80-80-80-in-2030-infographic.pdf?sfvrsn=57172d48_2). These are also adopted in the Green Mark: 2021 scoring.

1. Accelerating the greening of 80% of buildings by 2030, which includes the following steps:

Annually publishing energy performance data in the Building Energy Benchmarking Report,24 which does the following:

Informs building owners and facilities managers on how well their buildings have performed

Spurs them to initiate and implement improvements in building energy efficiency25

Shapes the market through information transparency of buildings' energy performance

Raising the mandatory environmental sustainability standards (including raising the minimum energy performance requirements for new buildings and existing buildings that undergo a major retrofit, and introducing mandatory sustainable construction practices to lower the carbon footprint of our buildings)

Updating the Green Mark: 2021 scheme, aligned with the United Nations' Sustainability Development Goals, to raise energy performance standards and place greater emphasis on other important sustainability outcomes such as designing for maintainability, reducing embodied carbon across a building's life cycle, and creating healthier environments for building users

2. Requiring 80% of new developments by GFA to be SLE26 buildings from 2030 by mandating the following:

New public sector buildings attain Green Mark certification, including Green Mark Platinum for new buildings with an air-conditioned area exceeding 5,000 m2

Green Mark Platinum SLE standards or equivalent for all new and existing buildings (upon a major retrofit)

Enhanced sustainability standards to further drive energy efficiency and carbon reduction for projects developed on land sold under the GLS from June 2022

3. Increasing energy efficiency for best-in-class green buildings to an 80% improvement by 2030 by codeveloping alternative cooling technologies, data-driven smart building solutions and next-generation building ventilation with building owners and developers and through industry partnerships

[1] See [About the BCA](https://www1.bca.gov.sg/about-us/about-bca).

[2] See [About the BCA Green Mark Scheme](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/2nd_green_building_masterplan.pdf?sfvrsn=d9da2e13_0).

[3] See [Green Building Masterplans](https://www1.bca.gov.sg/buildsg/sustainability/green-building-masterplans).

[4] Section 22FA of the Building Control Act 1989.

[5] Regulation 4 of the 2013 Regulations.

[6] The BCA [Green Mark: 2021 Certification Standard (Second Edition)](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/20240101_certification_standard_r2.pdf?sfvrsn=4571c497_0).

[7] See [About the BCA Green Mark Scheme](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/2nd_green_building_masterplan.pdf?sfvrsn=d9da2e13_0).

[8] See FIDIC [Rating & Certification Tool: BCA Green Mark](https://fidic.org/sites/default/files/R%26C%20BCA%20Green%20Mark%20-%20final.pdf).

[9] The BCA [Green Mark: 2021 Certification Standard (Second Edition)](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/20240101_certification_standard_r2.pdf?sfvrsn=4571c497_0).

[10] The BCA [Green Mark: 2021 Certification Standard (Second Edition)](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/20240101_certification_standard_r2.pdf?sfvrsn=4571c497_0).

[11] All building types include industrial, institutional and commercial buildings (office, hotel, retail and mixed development), stations, port facilities, residential and residential landed buildings, and simple structures such as farms and bridges; see [FAQ on Building Control (Environmental Sustainability) Regulations 2008](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/faq-on-environmental-sustainability-requirements.pdf).

[12] Regulation 3(1). Exempting projects involving a GFA of less than 5,000 m2 from the need to comply with the 2008 Regulations is based on the BCA's assessment of standards stipulated by the Energy Conservation Act 2012, which addresses inefficient building systems at the source and supply end, particularly for smaller projects; see BCA Circular: [Amendments to The Building Control (Environmental Sustainability) Regulations 2008 and adoption of the Code For Environmental Sustainability of Buildings (edition 4.0) and Code on Environmental Sustainability Measures for Existing Buildings (edition 3.0)](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/circular_gm_strd_for_exist_bldgs_periodic_rev1.pdf?sfvrsn=689af762_6); 1 September 2021.

[13] Regulation 6(1)(b).

[14] Projects with a planning permission submission date on or after 1 December 2021 must adopt the fourth edition of the Code for Environmental Sustainability of Buildings.

[15] See the [Second Reading of the Building Control (Amendment) Bill](https://sprs.parl.gov.sg/search/#/sprs3topic?reportid=bill-192) by the senior minister of state for national development, 10 September 2012.

[16] Section 22FA of the Building Control Act 1989.

[17] [Regulation 3(1), superseded](https://sso.agc.gov.sg/SL/BCA1989-S383-2013/Historical/20130701?DocDate=20160701&amp;ValidDate=20130701&amp;ProvIds=P1II-#pr3-).

[18] [Building Control (Environmental Sustainability Measures for Existing Buildings) (Amendment) Regulations 2016](https://sso.agc.gov.sg/SL-Supp/S313-2016/Published/20160701170000?DocDate=20160701170000).

[19] Regulation 3(1) of the 2013 Regulations.

[20] Data centers must nonetheless comply with SS 564-1:2020 Sustainable data centres - Part 1: Energy and environmental management systems and SS 564-2:2020 Sustainable data centres - Part 2: Guidance for energy and environmental management systems, developed and updated by the Infocomm Media Development Authority (IMDA) from time to time to reduce data centers' energy consumption and operating costs and enhance their competitiveness. The 2013 revisions are modeled after the ISO 50001 standard on energy management and specifically tailored to meet the needs of data centers in Singapore; see [IMDA: Green Data Centre Standard](https://www.imda.gov.sg/regulations-and-licensing-listing/ict-standards-and-quality-of-service/it-standards-and-frameworks/green-data-centre-standard).

[21] See the NEA: [Industrial Sector Mandatory Energy Management Practices for Existing Industrial Facilities](https://www.nea.gov.sg/our-services/climate-change-energy-efficiency/energy-efficiency/industrial-sector/mandatory-energy-management-practices-for-existing-industrial-facilities) and note that, from 22 April 2013, a corporation:

Has operational control over a business activity that has attained the energy use threshold of 54 terajoules of energy used per calendar year in at least two out of the three preceding calendar years

Carries out the business activity at a single site and is attributable to one of the following sectors:

Manufacturing and manufacturing-related services

Supply of electricity, gas, steam, compressed air and chilled water for air-conditioning

Water supply and sewage and waste management

Will be a registrable corporation under the [Energy Conservation Act 2012](https://sso.agc.gov.sg/Act/ECA2012) and subject to the stipulated energy management practices under the [Energy Conservation Act 2012](https://sso.agc.gov.sg/Act/ECA2012) and the [Energy Conservation (Energy Management Practices) Regulations 2013](https://sso.agc.gov.sg/SL/ECA2012-S246-2013?DocDate=20230331).

[22] Changi Airport Group (Singapore) Pte Ltd, whose assets and operations under its business control include four passenger terminal buildings, Changi Airfreight Complex and the aircraft operating areas of Changi Airport, maintains ISO 14001:2015 certification for Energy and Emissions Management; see [Changi Airport Group Forging A Sustainable Changi Sustainability Report 2021 – 2022](https://www.changiairport.com/content/dam/cacorp/sustainability/sustainable-changi/sustainability-report/CAG%20Sustainability%20Report%20FY2122.pdf).

[23] The [Maritime Singapore Green Initiative](https://www.mpa.gov.sg/regulations-advisory/maritime-singapore/sustainability), introduced by the Maritime and Port Authority of Singapore in 2019 and extended to 31 December 2024, comprises four voluntary programs for ships, ports and green energy to promote decarbonization of shipping.

[24] See the BCA [Building Energy Benchmarking Report (Statistics and Figures) 2021](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/bca-building-energy-benchmarking-report-(bebr)-2021.pdf?sfvrsn=1f6d0bdc_0).

[25] From 2023, the BCA will also provide individual energy performance data for healthcare facilities, sports and recreation centers, and institutional buildings, and identify them by name. Buildings will be ranked by energy performance among other buildings of similar typology. The next edition of the report will be published on the BCA's website; see Budget 2023: [speech by the senior minister of state for national development and communications & information](https://www.mnd.gov.sg/newsroom/parliament-matters/speeches/view/speech-by-mr-tan-kiat-how-senior-minister-of-state-for-national-development-and-communications-information-at-the-committee-of-supply-debate-on-tues-2-mar-2023-in-parliament); 2 March 2023.

[26] See the BCA's [Super Low Energy program](https://www1.bca.gov.sg/buildsg/sustainability/super-low-energy-programme).

# Energy Performance Certificates and Minimum Energy Standards

## Is there a mandatory form of energy performance certification? When does it apply and are there any prescribed minimum standards?

**Introduction**

The building sector, which is responsible for more than one-third of Singapore's total electricity consumption, is included in the government's commitment to reducing its emissions intensity by 36% from 2005 levels by 2030.

The BCA is driving the energy efficiency of buildings, working closely with industry and stakeholders, in accordance with its [SLE Buildings Technology Roadmap](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/sle_tech_roadmap.pdf?sfvrsn=8b09f272_0), which the BCA introduced in 2018.1 The SLE Buildings Technology Roadmap reviewed existing technology roadmaps developed in 2014 and set normalized energy efficiency index targets to achieve improvements in the energy efficiency index by 40% (moderate adoption) to 60% (aggressive adoption) in over 2,013 best-in-class buildings (Green Mark Platinum as a proxy) by 2030.

The BCA has progressively raised buildings' energy performance through regulation, incentives and building R&D. This has resulted in the current best-in-class buildings using at least 50% less energy compared to 2005 levels and the building stock's energy use intensity improving by 9% overall since 2008.2

The BCA's stated aspiration is to achieve Positive Energy, Zero Energy and SLE buildings that are 60%-80% more energy efficient than 2005 levels.

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| **Categories of SLE building** | **SLE building's energy savings and energy sources** |
| Positive Energy | * 115% of all energy consumption, including plug load, supplied from on-site renewable energy sources |
| Zero Energy | * All energy consumption, including plug load, supplied from on-site and off-site renewable energy sources * On-site renewable source to be first maximized before exploring off-site renewable sources * Renewable energy certificates must comply with SS 673: 2021 Code of Practice for Renewable Energy Certificates:3   Renewable energy generated within Singapore  Minimum of three years with commitment to recertification |
| SLE | * Best-in-class Green Mark building achieving at least 60% energy savings compared to 2005 levels, which is being used as the anchor reference for Green Mark energy savings |

**Green Mark: 2021 energy efficiency certification**

The first edition of the [Green Mark: 2021 certification standard](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/20211028_certification-standard_r1-1.pdf) applies from 1 November 2021 to 31 December 2023. The second edition is planned to come into effect from 1 June 2024.

The Green Mark: 2021 assessment framework comprises the following:

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| **Assessment framework** | **Application** |
| Green Mark: 2021 | Recognizes performance that is above mandatory, regulated standards, which includes robust levels of energy efficiency and applies to both of the following:  Developments at the design and completion (as built) stage  Existing buildings that are either:  Undergoing retrofitting (including a major change to the cooling system or major energy-use change as defined under Part IIIB of the Building Control Act 1989 and the 2013 Regulations)  In operation but with no previous Green Mark certification |
| Green Mark: 2021 In Operation | Simplified version of Green Mark: 2021 for projects that have previously been assessed and fully certified under Green Mark that have demonstrated their holistic environmental performance  Tracks the key performance indicators (KPIs) based on actual operational data to ensure that the building is performing to the same Green Mark: 2021 standard  Applies to the following:  Existing buildings in operation that have previously held Green Mark certification, and with no major energy use change  Projects seeking Green Mark recertification |

Most of the building types are eligible for assessment, including office towers, retail buildings and hotels. However, Green Mark: 2021 does not apply to office interiors, retail interiors or other interior fit-out projects.

Building projects must meet either the 2008 Regulations or the 2013 Regulations before Green Mark certification is conferred. The 2008 Regulations were amended in 2022 to adopt the Green Mark certification of Green Mark Platinum SLE as the minimum requirement.4

The following projects are required to adopt one of three energy efficiency (operational carbon) pathways leading to greater energy efficiency, with each pathway describing the requirements to achieve an energy efficiency of 50%, 55% and 60% (SLE standard) to demonstrate their energy efficiency levels:

New nonresidential development

New residential development

Existing nonresidential development

Green Mark: 2021 adopts the World Green Building Council's term of "operational carbon," which describes the amount of carbon emissions associated with energy used to operate the building or in the operation of infrastructure.

The energy efficiency (operational carbon) pathways are as follows:

Aligned to real project performance with validated data with flexibility for projects to demonstrate their performance

Outcome-based with full recognition of passive design strategies and renewable energy systems' contribution to energy savings

Supportive of innovation, encouraging the use of new technologies, approaches and solutions to energy performance

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| **Pathway** | **Metric** |
| Pathway 1 — energy use intensity (EUI) | EUI measures the total annual energy consumption of a building over the GFA (in kilowatt-hour/m2/year), based on the following:   * Energy modeling (design) * Energy calculation and measured data (retrofit) * Measurement — in operation |
| Pathway 2 — fixed metrics | A prescriptive pathway where projects must demonstrate high levels of performance in each of the key building energy systems.   * Key performance metrics (ingredients) that make an energy-efficient project — all aspects must be met individually. * Any shortfall in performance can be made up with the use of on-site renewables, subject to the building typology multiplication factor. |
| Pathway 3 — energy savings | Energy savings demonstrated by energy modeling in accordance with the [Green Mark: 2021 Energy Modelling Guideline](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/20210909_energy-modelling-guideline_r1.pdf), which measures energy savings by comparing the annual energy consumption of the proposed model (designed building) against the reference model (baseline building) |

**Singapore Green Building Council (SGBC) certification schemes**

The SGBC is a nonprofit organization, launched in 2009 as a private-public sector partnership with the key role of advocating green building design, practices and technologies and driving environmental sustainability in the building and construction industry.5 In March 2015, the SGBC introduced the following schemes:

The [Singapore Green Building Product](https://www.sgbc.sg/sgbc-certifications/sgbp-certification) (SGBP) certification scheme

Recognized by the BCA's Green Mark, SGBP-certified products accrue points that count toward a project's Green Mark rating

Complies with many of the requirements in ISO 14024 environmental labels and declarations and Type I environmental labeling, and is accepted by regional green building rating tools such as the following:

GreenRE, a rating tool set up by the Real Estate and Housing Developers' Association of Malaysia

LOTUS, the Vietnam Green Building Council's rating tool

The [Singapore Green Building Services](https://www.sgbc.sg/sgbc-certifications/sgbs-certification) (SGBS) certification

This is a platform to recognize and profile professional services firms that deliver best-in-class green buildings aligned with the latest industry benchmarks and best practices.

SGBS-certified firms are recognized under the Green Mark certification scheme.

**Energy modeling**

The BCA considers6 energy modeling an integrated approach that does the following:

Provides a good gauge of the building's energy consumption

Identifies energy efficiency opportunities

Indicates how a building is going to operate

To attain higher-tier Green Mark certifications (i.e., GoldPLUS or Platinum), the BCA requires demonstratable energy savings through energy modeling. As part of their application and assessment process for GoldPLUS or Platinum Green Mark certification, developers and building owners must measure the building's energy performance by comparing the annual power consumption of the proposed model (designed building) against the reference model7 (baseline building). The reference model complies with the 2008 Regulations or the 2013 Regulations and the Singapore standards on energy efficiency, lighting and ventilation, which include the following:

[SS530:2014+A1:2018 — Code of Practice for energy efficiency standard for building services and equipment](https://www.singaporestandardseshop.sg/Product/GetPdf?fileName=190212134105SS%20530-2014%28plus%29A1-2018%20-%20Preview.pdf&amp;pdtid=f7a3d234-223b-42a5-b509-45496aae20dd). This code, first issued in 2006, was revised in 2014 and amended in 2018. This code does the following:

Raises the energy efficiency requirements in accordance with international standards for air-conditioning equipment, water heaters, electric motors and lighting power density

Adopts new methods to determine efficiency for water chilling packages and lighting power density

Includes new efficiency standards for buildings with high-capacity service water-heating, systems, distribution transformers, and lifts and escalators

[SS CP13:1999 — Code of Practice for mechanical ventilation and air conditioning in buildings (Incorporating Amendment No. 1, February 2000 and Erratum No. 1, June 2001)](https://www.singaporestandardseshop.sg/Product/GetPdf?fileName=060421171050Preview%20-%20CP%2013-1999%28plus%29Amd1%26Err1.pdf&amp;pdtid=8690d588-7d33-42e5-a541-d0f684f966fe), which establishes a broad standard for engineers, architects, contractors, and owners to comply with in matters relating to mechanical ventilation and air-conditioning

[SS CP 38:1999 — Code of Practice for artificial lighting of buildings](https://www.singaporestandardseshop.sg/Product/SSPdtDetail/c6ff56f7-4f52-4118-a801-cc7261bfc0f1#:~:text=Code%20of%20practice%20for%20artificial%20lighting%20in%20buildings&amp;text=Also%20establishes%20the%20criteria%20for,activities%20thus%20enhancing%20visual%20comfort.), which recommends a range of illuminance levels for various types of buildings and recommended design illuminances, and establishes the criteria for the design, installation, and maintenance of artificial lighting in buildings so as to provide sufficient lighting for indoor activities, thus enhancing visual comfort

[Code on Envelope Thermal Performance for Buildings](https://www1.bca.gov.sg/docs/default-source/docs-corp-news-and-publications/publications/codes-acts-and-regulations/retv.pdf) to assist architects and professional engineers to comply with the envelope thermal performance standards prescribed in the building regulations

The proposed model must perform better than the reference model in total annual savings in energy consumption through the following:

Better building design

Higher improved equipment efficiency

Lower thermal transmittance of building envelope

Simulation results from the proposed model must show at least the following:

25% savings in annual energy consumption compared to the reference model for Green Mark GoldPLUS

30% energy savings for Green Mark Platinum

**Mandatory submission of periodic energy audits of cooling systems**

The system performance of any building cooling system, including the energy-efficient ones, is expected to deteriorate over time if not properly operated and maintained. As such, the BCA requires a periodic energy audit8 by a registered energy auditor9 to ensure that the building cooling system continues to operate as efficiently as per its initial design throughout its life cycle and comply with the minimum standards stipulated in the [Code on Periodic Energy Audit of Building Cooling System](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/periodic-energy-audits-code_edition-4-0s.pdf) ("**Energy Audit Code**").

The following buildings will have to carry out the energy audit:10

Existing buildings that have undergone the installation, substantial alteration or replacement of a building's/development's water-cooled/air-cooled chiller(s) (major energy-use change) unless excepted11

New buildings that have applied for planning permission on or after 1 December 2010

Building owners must ensure that the building cooling system's level of operating system efficiency meets the minimum system efficiencies stipulated in the Green Mark certification standard referred to in the 2008 Regulations and the 2013 Regulations and in the Energy Audit Code, which does the following:

Sets out the energy efficiency standard applicable to a cooling system of the building

Stipulates the manner that an energy audit is to be carried out in determining the building cooling system's level of energy performance during operation

Spells out the required qualification and experience for an energy auditor's registration or renewal of registration

The CBC, appointed under the Building Control Act 1989, will issue notices requiring periodic audit of energy efficiency to building owners and allow a reasonable timeframe for them to complete the energy audit.

Existing buildings: The CBC may serve the first notice no less than 36 months from the date of the notice of approval of the as-built score.

New buildings: The CBC may serve the first notice at any time after the temporary occupation permit or certificate of statutory completion is issued.

For subsequent energy audit submissions, the CBC may serve each subsequent notice no less than 36 months after the date that the last notice was served.12

**Mandatory energy improvement**

The BCA will introduce the mandatory energy improvement (MEI) regime by the end of 202413 to double down on efforts to decarbonize the built environment, focusing on reducing emissions from older existing buildings with poor energy performance that are not subject to the minimum energy performance standards. The MEI regime will apply to most energy intensive commercial buildings, healthcare facilities, sports and recreation centers, and institutional buildings with a GFA of 5,000 m2 and above with an EUI above a predetermined threshold.

MEI comprises the following two components, subjecting building owners to the following:

Energy audits: Building owners will be required to appoint a professional to review the major energy-consuming systems in their building, and identify possible measures to improve energy efficiency and optimize energy use. The audit report will also contain a cost-benefit analysis of the measures to help building owners in their decision-making.

Energy efficiency improvement plan: Based on the findings of the energy audit, building owners will be required to develop and implement energy efficiency improvement measures to improve their buildings' EUI, ranging from simple, low-cost measures (e.g., maintenance work, replacing faulty parts or sensors, installing monitoring instruments) to more complex retrofitting works. Building owners may also work with their occupants and tenants through sustainability initiatives such as green leasing. Building owners will need to undertake these energy efficiency improvement measures within a stipulated timeframe and maintain their improved EUI over a minimum period.

[1] See the BCA media release: [BCA Drives The Next Generation Of Green Buildings - The Super Low Energy Buildings](https://www1.bca.gov.sg/docs/default-source/docs-corp-news-and-publications/media-releases/pr_sgbw2018.pdf?sfvrsn=6749b909_4).

[2] See the BCA: [Super Low Energy Building Technology Roadmap](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/sle-tech-roadmap-report--published-ver1-1.pdf?sfvrsn=f2df22ed_0).

[3] See the Singapore Standards Council media release: [New Singapore Standard launch to support management and use of Renewable Energy Certificates](https://scic.sg/images/New-singapore-standard-launch-to-support-management-and-use-of-renewable-energy-certificates.pdf).

[4] Regulation 4(1)(f) in relation to building on land sold on or after 30 June 2022 under the GLS.

[5] See [About the SGBC](https://www.sgbc.sg/about-us/about-sgbc).

[6] See the BCA: [Green Mark Certification Scheme: Energy Modelling](https://www1.bca.gov.sg/buildsg/sustainability/green-mark-certification-scheme/energy-modelling) and [Green Mark: 2021 Energy Modelling Guideline](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/20210909_energy-modelling-guideline_r1.pdf).

[7] See the [Framework for Energy Modeling for Green Mark Incentive Scheme (GMIS)](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/em_frame.pdf).

[8] Section 22FF of the Building Control Act 1989 requires a periodic audit of the building cooling system's energy efficiency, and Regulation 9 of the 2013 Regulations requires the energy audit to be conducted in accordance with the Energy Audit Code.

[9] Regulation 10 of the 2013 Regulations.

[10] See [FAQ on Environmental Sustainability Requirements](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/faq-on-environmental-sustainability-requirements.pdf).

[11] Regulation 3 of the 2013 Regulations provides that Type A buildings (buildings used (a) as data centers; (b) as religious buildings; (c) as residential buildings (other than serviced apartments); or (d) as utility buildings) and Type B buildings (buildings used (a) as industrial buildings, industrial retail buildings, light industrial buildings or special industrial buildings; (b) as railway premises; (c) to provide airport services and facilities; or (d) to provide port services and facilities) are exempt from the energy audit.

[12] See the [BCA Circular to Building Owners And Professional Institutes/Associations 9 December 2013](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/2nd-circular.pdf?sfvrsn=5d4dd761_4) and the Energy Audit Code, para. 5.1.1.

[13] See the BCA media release: [Strengthening Resilience of the Built Environment Sector for Next Bound of Industry Transformation](https://www1.bca.gov.sg/docs/default-source/docs-corp-news-and-publications/media-releases/2-mar-2023---strengthening-resilience-of-the-built-environment-sector-for-next-bound-of-industry-transformation.pdf?sfvrsn=5be8c0b9_4); 2 March 2023.

# Incentives for Green Retrofit

## Are there any government-funded or sponsored schemes for improving the energy efficiency of existing buildings and, broadly, how do they work?

Green Mark Incentive Schemes (GMIS) were introduced to accelerate the adoption of environmentally friendly building technologies and building design practices through cash or GFA incentives.

**Built Environment Transformation Gross Floor Area Incentive Scheme ("BE Transformation GFA Scheme")1**

Under the BE Transformation GFA Scheme, valid for five years from 24 November 2021 to 23 November 2026, unless otherwise extended, the BCA and the Urban Redevelopment Authority (URA), Singapore's land use planning and conservation authority, allow additional GFA in excess of the master plan gross plot ratio (GPR) as an incentive for developers and building owners. In satisfying the [Construction Industry Transformation Map](https://www.mnd.gov.sg/our-work/creating-future-ready-industries/construction) outcome requirements in digitalization, productivity and sustainability in the development and redevelopment of private sites or GLS sites launched on and prior to 31 March 2022, of at least 5,000 m2 GFA, developers/building owners enjoy either of the following:

Up to 3% additional GFA

Up to 2% bonus GFA above the master GPR if the superstructural works have not commenced for building developments on sites launched under the GLS program on or prior to 31 March 2022

The types of eligible developments are as follows:

Residential non-landed and other developments (approved on a case-by-case basis)

Nonresidential commercial, industrial and institutional developments, such as office, retail, business park, community building, hotel, hospital or white-site developments

Any combination of the above

Where development proposals fall within areas with specific planning considerations (e.g., story height controls) or are unable to fully accommodate the additional intensity due to on-site conditions (e.g., areas with traffic concerns), a lower quantum of additional GFA may be granted and/or the bonus GFA may be limited to a particular use or uses.

**SGD 63 million Green Mark Incentive Scheme for Existing Buildings 2.0 (GMIS-EB 2.0)2**

The Ministry for National Development (MND), the key government ministry responsible for national land use and development planning,3 recognizes the cost challenges to green an existing building. The MND estimated that basic retrofitting, which involves upgrading the building's existing building cooling system, typically takes three to seven years to pay off via savings in the form of lower energy bills and operating costs. Thus, in addition to mandatory legislation, the BCA also offers incentives to encourage these building owners to achieve higher energy efficiency.4

The GMIS-EB 2.0 was launched on 30 June 2022 and is available from 30 June 2022 till the funds have been fully committed or 31 March 2027 (whichever is earlier). The objective of the GMIS-EBP 2.0 is to raise the energy performance of existing buildings and step up the pace to green 80% of our buildings by 2030, in line with the Green Building Masterplan's environmental sustainability ambitions and the target to accelerate the transition to a low-carbon built environment.

GMIS-EBP 2.0 is outcome-based where grants are provided to building owners based on the Green Mark certification rating and actual carbon abated achieved through energy improvement works (EIWs), subject to a cap.

|  |  |  |
| --- | --- | --- |
| **Qualifying certification** | **Funding factor (per ton of carbon dioxide equivalent (tCO2e))** | **Cap** |
| Green Mark Platinum | SGD 25 | SGD 600,000 or up to 50% of the qualifying cost, whichever is lower |
| Green Mark SLE | SGD 35 | SGD 900,000 or up to 50% of the qualifying cost, whichever is lower |
| Green Mark Zero Energy | SGD 45 | SGD 1.2 million or up to 50% of the qualifying cost, whichever is lower |

The grants will lower the upfront capital costs for energy efficiency retrofits, allowing building owners to attain higher energy performance and improve the returns on investment, particularly for buildings meeting SLE or Zero Energy standards.

GMIS-EB 2.0 applies to the following privately owned existing buildings with a GFA of at least 5,000 m2:

Commercial and institutional developments (e.g., hotels, offices, retail buildings, healthcare facilities, community institutions)

Light industrial buildings under specified Singapore Standard Industrial Classification codes (Energy savings from manufacturing, industrial and commercial processes are excluded from the energy savings calculation.)

Residential buildings, only including energy savings from common areas/services

Once the BCA issues a letter of acceptance (LOA) to the building owner indicating the maximum grant and the owner concludes a valid and binding agreement between the owner and the BCA incorporating the required [terms and conditions](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/gmis-eb-2-0-tcs-nov-2022.pdf?sfvrsn=a63acf23_0), the BCA will disburse the grant in two tranches:

Owners may submit the first tranche application upon receiving the LOA from the BCA and after the commencement of the EIWs: The quantum of the first tranche shall be determined based on the costs incurred by the owner for actual qualifying costs, being costs incurred for the following:

Purchasing and installing the EIWs

Carrying out building works to convert air-conditioned spaces to naturally ventilated or mixed-mode ventilation spaces

Procuring professional services for the project as of the date of the first tranche application

Owners may submit the second tranche application, with supporting documents, after the completion of the EIWs and no later than 36 months from the date of the LOA. The owner must ensure that its development has achieved the Green Mark certification and completed the Green Mark verification. The second tranche quantum will be based on whichever is lowest of the following calculations (and will not exceed an amount equal to the maximum grant amount less the quantum of the first tranche):

The actual carbon abated

50% of the actual qualifying costs incurred by the owner for the project

The applicable funding cap

**JTC's solar deployment scheme5**

JTC Corporation (JTC), the government agency in charge of planning and developing industrial infrastructure,6 plans to deploy solar photovoltaic (PV) panels at all feasible JTC buildings, vacant industrial land and at sea by 2030, with JTC aiming to persuade more privately leased industrial properties to do the same. As of May 2023, privately leased industrial properties make up 72% of the total potential solar capacity from industrial estates.

The aim is to have all these solar panels — including those deployed at sea — achieve a solar capacity of 1,250 megawatt-peak (MWp), or contributing to 60% of Singapore's total solar deployment target of at least 2 gigawatt-peak (GWp), by 2030. This target, enough to power about 350,000 households here for a year, is expected to make up 3% of Singapore's total electricity demand in 2030.

Mandatory solar deployment:7 Solar deployment is mandatory for the following JTC leases:

New and renewed land and land-based facilities

(With effect from 1 April 2022) on the assignment/transfer or redevelopment of the land and land-based facility

If the site has at least the following:

800 m2 of available contiguous rooftop area

Fifteen years of remaining lease term or more

Voluntary solar deployment: Where the land or land-based facility does not meet the above conditions, a JTC lessee may still choose to install solar panels voluntarily.

From 1 December 2022, JTC lessees are not required to apply for consent for their voluntary solar deployment that only comprises the installation of solar PV panels and supporting equipment that do not do the following:

Result in changes in the authorized use, GFA, use quantum as specified by the URA and plot ratio

Affect the structural integrity of an existing building

Nonetheless, the JTC lessee is still required to obtain JTC's consent for any additions and alterations to the JTC land and land-based facilities and may also be required to obtain approval from other authorities such as the URA and the Singapore Civil Defence Force.

Under the terms of the JTC solar deployment,8 solar panels are installed for free (i.e., no capital cost through the Solar Roof programme with JTC's appointed vendor, currently being Sembcorp Solar) and JTC lessees can enjoy discounted rates for power generated from solar panels on their roofs. Alternatively, they can earn revenue by leasing their roof space for solar panels to be installed. The three models of deployment are:

Rooftop licensing (no capital cost): JTC's appointed vendor installs PV panels on the premises and pays rental to the JTC lessee. The solar-generated energy is then exported to the national grid by the solar vendor.

Solar leasing (no capital cost): JTC's appointed vendor installs PV panels on the premises. The solar-generated energy is then sold to the JTC lessee at a discounted rate to offset its building power consumption.

Direct ownership: The JTC lessee purchases PV panels from its own solar vendor and arranges for installation. The solar energy generated is for the JTC lessee's own consumption on the premises, and the JTC lessee may sell excess energy to the grid.

Since July 2022, the minimum contract period for solar deployment has been reduced from 15 years to eight years, allowing companies with shorter lease periods to also benefit.9

**Green Buildings Innovation Cluster (GBIC) programme10**

The GBIC programme, established in 2014, supports the development and demonstration of innovative energy-efficient technologies and solutions with high potential to be widely adopted.

To push the boundaries of energy efficiency in buildings, the BCA provides enhanced funding of SGD 45 million11 for the GBIC programme. The enhanced programme, GBIC 2.0, available for applications by industry and research communities from 2022, targets key demand drivers, such as building owners and developers, and their value chains to cocreate and accelerate solutions and commercialization through industry partnerships. Research areas under GBIC 2.0 include developing alternative cooling technologies, data-driven smart building solutions and next-generation building ventilation.

[1] See the BCA [Factsheet on Built Environment Transformation Gross Floor Area (GFA) Incentive Scheme](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/factsheet-and-faqs.pdf?sfvrsn=1850794_0).

[2] See the BCA [Green Mark Incentive Schemes: Green Mark Incentive Scheme for Existing Buildings 2.0 (GMIS-EB 2.0)](https://www1.bca.gov.sg/buildsg/sustainability/green-mark-incentive-schemes/green-mark-incentive-scheme-for-existing-buildings-2.0) and [Green Mark Incentive Scheme for Existing Buildings 2.0 (GMIS-EB 2.0) Factsheet](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/gmis-eb-2-0-factsheet-nov-2022.pdf?sfvrsn=b78a7c30_0).

[3] See the MND [Introduction](https://www.mnd.gov.sg/who-we-are/introduction).

[4] See the [Second Reading of the Building Control (Amendment) Bill](https://sprs.parl.gov.sg/search/#/sprs3topic?reportid=bill-192) by the senior minister of state for national development, 10 September 2012.

[5] See JTC [Managing tenancy or lease: Solar deployment](https://www.jtc.gov.sg/get-help/managing-your-tenancy-or-lease/solar-deployment).

[6] See [JTC: Who We Are](https://www.jtc.gov.sg/about-jtc/who-we-are).

[7] See JTC [Managing tenancy or lease: Solar deployment](https://www.jtc.gov.sg/get-help/managing-your-tenancy-or-lease/solar-deployment).

[8] See the [JTC Environmental Sustainability: Solar Deployment Toolkit](https://www.jtc.gov.sg/-/media/project/jtc-cx/corpweb/assets/get-help/solar-deployment-toolkit.pdf).

[9] See JTC's press release: [JTC leads solar deployment across Singapore's industrial estates towards achieving potential solar capacity of 1,250 MWp](https://www.jtc.gov.sg/about-jtc/news-and-stories/press-releases/jtc-leads-solar-deployment-across-singapore-industrial-estates#:~:text=JTC%20SolarRoof%20to%20make%20solar%20adoption%20easy%20for%20companies&amp;text=Since%20July%202022%2C%20the%20minimum,also%20benefit%20from%20the%20programme.).

[10] See the BCA [Green Buildings Innovation Cluster (GBIC) program](https://www1.bca.gov.sg/buildsg/buildsg-transformation-fund/green-buildings-innovation-cluster-gbic-programme).

[11] See the MND: [Speech by MOS Faishal at the Singapore Green Building Council Gala Dinner](https://www.mnd.gov.sg/newsroom/speeches/view/speech-by-mos-faishal-at-the-singapore-green-building-council-gala-dinner); 15 September 2023.

# CO2 and Energy Targets

## Are there any national targets for CO2 reduction and/or energy use reduction from buildings? If there are, are there any exclusions?

**Introduction**

Singapore submitted its enhanced Nationally Determined Contribution (NDC) and its Long-Term Low-Emissions Development Strategy (LEDS) to the United Nations Framework Convention on Climate Change in 2022, revising1 its commitment to reducing emissions to around 60 million tonnes of carbon dioxide equivalent (MtCO2e) in 2030 after peaking emissions earlier.2

Based on earlier projections, this is consistent with Singapore's existing 2030 NDC, which states that Singapore aims to achieve a 36% reduction in emissions intensity (EI) from 2005 levels by 2030. Singapore also aims to halve emissions from its peak to 33 MtCO2e by 2050, with a view to achieving net-zero emissions as soon as viable in the second half of the century.

Singapore's low-carbon transition will involve concrete actions across all sectors, building on its long-standing emphasis on sustainable development and will have three thrusts.

Transformations in industry, economy and society, e.g., more renewable energy, greater energy efficiency, reduced energy consumption

Adoption of advanced low-carbon technologies, e.g., carbon capture, utilization and storage (CCUS), and use of low-carbon hydrogen

Effective international collaboration, e.g., international climate action, regional power grids, market-based mechanisms

According to the MND,3 buildings accounted for about 11 MtCO2e of carbon emissions in 2018, the most recent year for which verified data is available, with a projected increase in emissions arising from the recovery in the construction of new buildings following the pandemic.

To reduce embodied carbon in buildings, the BCA requires building projects to adopt a minimum number of sustainable construction practices under the following codes:4

[Code for Environmental Sustainability of Buildings (Edition 4.0)](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/es-code_reg-2008_edition-4-0.pdf) under the 2008 Regulations, which requires the following:

For new residential buildings: a selection of four carbon reduction measures in total as listed in Table 4.2(a), including a minimum of two measures from Section 2: Sustainable Construction

For new nonresidential buildings: a selection of four carbon reduction measures in total as listed in Table 4.2(b), including a minimum of two measures from Section 2: Sustainable Construction

[Code on Environmental Sustainability Measures for Existing Buildings (Edition 3.0)](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/esm-code_reg-2013_edition-3-0.pdf) under the 2013 Regulations, which requires, for existing nonresidential buildings, all base requirements listed in Table 4.1, where relevant, and a selection of three carbon reduction measures from Table 4.2, with at least one measure from Sustainable Operation and Management

The following building works and types of use are exempted from the above codes:

Building works involving a GFA of less than 5,000 m2

Type A buildings used as the following:

Data center

Religious building

Residential building (other than serviced apartments)

Utility building

Type B buildings used as follows:

As an industrial building, an industrial retail building a light industrial building, or a special industrial building

As railway premises

To provide airport services and facilities

To provide port services and facilities

However, note that, under the [Carbon Pricing Act 2018](https://sso.agc.gov.sg/Act/CPA2018), the following business facilities emitting a total amount of reckonable greenhouse gas (GHG) equal to or above 2,000 tCO2e annually directly into the atmosphere must register5 with the National Environment Agency (NEA):

Manufacturing and manufacturing related services

Supply of electricity, gas, steam, compressed air and chilled water for air-conditioning

Water supply and sewage and waste management

Such business facilities could be carrying out any of the abovementioned activity at a single site or a series of the abovementioned activities at more than one parcel of land that:

Are contiguous, adjacent or adjoining

Are separated by any road, pathway, drain or waterway

Have a dependency between the activities carried out on the parcels of land

All registered business facilities must submit an emissions report annually6 to the NEA on emissions in respect of the business.

Registered business facilities emitting at least annual direct GHG emissions of 25,000 tCO2e are subject7 to a carbon tax. The carbon tax rate will increase to SGD 25 per tonne in 2024, and to SGD 45 per tonne in 2026, with a view to reaching SGD 50 to SGD 80 per tonne by 2030.8 From 2019 to 2023, Singapore's carbon tax rate is set at SGD 5 per tonne of GHG emissions.

Starting from 2024, in lieu of paying the carbon tax, businesses will be able to use high-quality international carbon credits to offset up to 5% of their taxable emissions. There will also be a transition framework that may provide allowances for existing companies for a share of their emissions, though details have yet to be announced.9

[1] See Strategy Group, Prime Minister's Office: [Singapore's Enhanced Nationally Determined Contribution and Long-Term Low-Emissions Development Strategy](https://www.nccs.gov.sg/media/press-release/singapores-enhanced-nationally-determined-contribution-and-long-term-low-emissions-development-strategy/), 28 February 2020.

[2] See Strategy Group, Prime Minister's Office: [Singapore Commits to Achieve Net Zero Emissions by 2050 and to a Revised 2030 Nationally Determined Contribution; Public Sector and Jurong Lake District to Lead The Way with Net Zero Targets](https://www.nccs.gov.sg/media/press-releases/singapore-commits-to-achieve-net-zero/); 25 October 2022.

[3] [Written answer by MND on current and projected levels of carbon emission by the built environment sector and plans to enhance green financing for construction companies](https://www.mnd.gov.sg/newsroom/parliament-matters/q-as/view/written-answer-by-ministry-of-national-development-on-current-and-projected-levels-of-carbon-emission-by-the-built-environment-sector-and-plans-to-enhance-green-financing-for-construction-companies); 2 November 2021.

[4] See the BCA circular: [Amendments to The Building Control (Environmental Sustainability) Regulations 2008 and adoption of the Code For Environmental Sustainability of Buildings (edition 4.0) and Code on Environmental Sustainability Measures for Existing Buildings (edition 3.0)](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/circular_gm_strd_for_exist_bldgs_periodic_rev1.pdf?sfvrsn=689af762_6); 1 September 2021.

[5] Section 7 of the Carbon Pricing Act 2018.

[6] Section 12 of the Carbon Pricing Act 2018.

[7] Section 16 of the Carbon Pricing Act 2018.

[8] See the NEA: [Climate Change: Carbon Tax](https://www.nea.gov.sg/our-services/climate-change-energy-efficiency/climate-change/carbon-tax).

[9] Baker McKenzie Wong & Leow client alert: [Singapore Budget 2022: Key tax updates](https://insightplus.bakermckenzie.com/bm/attachment_dw.action?attkey=FRbANEucS95NMLRN47z%2BeeOgEFCt8EGQJsWJiCH2WAUTleh6%2BAJHroOFX2vyaEDH&amp;nav=FRbANEucS95NMLRN47z%2BeeOgEFCt8EGQbuwypnpZjc4%3D&amp;attdocparam=pB7HEsg%2FZ312Bk8OIuOIH1c%2BY4beLEAeC2UoQruEoks%3D&amp;fromContentView=1), March 2022.

# Renewable Energy

## Are there any regulations requiring a percentage of energy consumption to come from renewable sources?

**Introduction**

While there are no regulations stipulating use of renewable energy as yet, Singapore is committed to achieving net-zero emissions by 2050.1 Despite being an alternative energy disadvantaged island city-state, Singapore is adopting2 the following strategies to increase domestic supply of low-carbon energy:

Maximizing solar deployment toward the target of at least two GWp of installed solar capacity by 2030

Importing up to four gigawatts (GW) of low-carbon electricity by 2035, which is around 30% of Singapore's projected electricity demand (Presently, the Singapore government has awarded conditional approvals for up to three GW of low-carbon electricity to be imported from Cambodia and Indonesia.)

Accelerating the exploration of low carbon alternatives:

Plans under the [National Hydrogen Strategy 2022](https://www.mti.gov.sg/-/media/MTI/HPO/Singapore-Hydrogen-Strategy/ebrochure_HPO_Oct_26.pdf) for hydrogen to complement and diversify Singapore's power mix alongside solar, imported electricity and other potential low-carbon energy sources (Depending on technological developments and the development of other energy sources, hydrogen could supply up to half of Singapore's power needs by 2050.)

Assessing the submissions from our expression of interest for low-carbon ammonia power generation and bunkering

Undertaking a nationwide study to assess Singapore's potential for deep geothermal and carbon sequestration

The BCA has also conducted research on the target of greening 80% of the building stock by 2030. The [Super Low Energy Building Technology Roadmap](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/sle-tech-roadmap-report--published-ver1-1.pdf?sfvrsn=f2df22ed_0) identified potential solutions from enhanced existing technologies and emerging research, development and demonstration (RD&D) initiatives and concluded the following:

Achieving SLE with 60% energy efficiency improvement (from 2005 levels) is technically feasible with best-in-class technologies today.

Further technological advancements and RD&D will be needed to reach 80% energy efficiency improvement, to make SLE both technically feasible and economically viable for mainstream adoption by 2030.

For JTC estates, buildings and vacant land, solar deployment is mandatory for the following:

New and renewed land/land-based facilities

Assignment/transfer or redevelopment of the land/land-based facilities

Sites with at least 800 m2 of available contiguous rooftop area and 15 years of remaining lease term or more

Where the above conditions are not met, the JTC lessee can adopt solar deployment voluntarily. JTC's consent is required for any addition and alteration works to the land/land-based facilities.3

[1] See Strategy Group, Prime Minister's Office: [Singapore Commits to Achieve Net Zero Emissions by 2050 and to a Revised 2030 Nationally Determined Contribution; Public Sector and Jurong Lake District to Lead The Way with Net Zero Targets](https://www.nccs.gov.sg/media/press-releases/singapore-commits-to-achieve-net-zero/); 25 October 2022.

[2] Written answers by the minister for trade and industry of Singapore to question: [Growing Renewable Energy Adoption To Meet Net-Zero Carbon Emissions Pledge](https://sprs.parl.gov.sg/search/#/sprs3topic?reportid=written-answer-na-14567); 19 September 2023.

[3] See JTC: [Managing tenancy or lease: Solar deployment](https://www.jtc.gov.sg/get-help/managing-your-tenancy-or-lease/solar-deployment).

# Regulation

## What other national regulatory measures are there, such as taxes on energy consumption and/or tax reliefs on energy-saving measures, that can encourage more efficient use of energy in buildings?

**Introduction**

On or before 31 March 2021, the Investment Allowance (Energy Efficiency) (IA-EE) scheme provided investment allowance for those energy efficiency improvement projects approved by the Economic Development Board (EDB), the government agency under the Ministry of Trade and Industry responsible for enhancing Singapore's position as a global center for business, innovation and talent. Data centers were subject to additional qualifying conditions.

The IA-EE scheme has been renamed the Investment Allowance for Emissions Reduction scheme,1 with the following revisions:

Expanded scope of qualifying projects to include projects involving a reduction of GHG emissions

Streamlined and updated eligibility conditions that apply to all projects approved by the EDB from 1 April 2021 to 31 December 2026 (both dates inclusive), there being no distinction between data centers and non-data centers

Qualifying research and development (R&D) activities may benefit from the R&D tax measures, which are targeted at encouraging businesses to build up R&D capabilities in Singapore. To qualify, the R&D activity must fall within the definition of R&D under Section 2 of the [Income Tax Act 1947](https://sso.agc.gov.sg/Act/ITA1947) and meet all three requirements. The Inland Revenue Authority of Singapore, the government agency in charge of administration of taxes and enterprise disbursements, has provided guidance2 on which energy-saving R&D activities meet the requirements (e.g., meeting the novelty or technical risk objective or comprising a systematic, investigative and experimental study in a field of science or technology).

In addition to the Building Control Act 1989, the 2008 Regulations and the 2013 Regulations, which primarily target office, hotel and retail buildings, the [Energy Conservation Act 2012](https://sso.agc.gov.sg/Act/ECA2012) regulates large energy users in the transport and industry sectors that consume more than 15 gigawatt-hours each year. Summarized below is a comparison3 between energy efficiency measures under the Building Control Act 1989 and the Energy Conservation Act 2012:

|  |  |  |
| --- | --- | --- |
| **Energy efficiency measures** | **Building Control Act 1989** | **Energy Conservation Act 2012** |
| Minimum standards | Under the initial phase, office, hotel, and retail buildings with a GFA of more than 15,000 m2 are required to meet the minimum standards, triggered by installing/replacing cooling systems. | No minimum standards, but prescribed users must submit energy efficiency improvement plans. |
| Reporting energy use | Utilities and building owners are required to submit energy consumption and building-related information. | Companies are required to appoint energy managers to submit energy efficiency plans. |
| Monitoring energy use | A periodic energy audit of the following is required:   * Any new building (for which an application for planning permission was submitted on or after 1 December 2010) * Any existing building that is having its air-cooled or water-cooled chiller installed or replaced and that is subject to the minimum standard under the 2013 Regulations | No mandatory energy audits, but energy efficiency plans submitted by energy managers must also include energy efficiency improvement plans. |

[1] See the Ministry of Finance: [Budget 2021 Annex F-1: Tax Changes](https://www.mof.gov.sg/docs/librariesprovider3/budget2021/download/pdf/annexf1.pdf).

[2] [IRAS e-Tax Guide Research and Development Tax Measures (Seventh Edition)](https://www.iras.gov.sg/media/docs/default-source/e-tax/research-and-development-tax-measures-etax-guide_6th-edition.pdf).

[3] See the BCA: [FAQS Periodic Energy Audit](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/faq_periodic_audit.pdf).

# Financing

## Are there any public or private “green” financing initiatives for sustainable real estate projects?

**Private "green" financing initiatives**

The Monetary Authority of Singapore (MAS), Singapore's central bank and integrated financial regulator, leads the Project NovA! Development consortium,1 which has launched a minimum viable product (MVP) to assist banks to tap into artificial intelligence (AI) when issuing sustainability-linked loans (SLLs) in the real estate sector. The NovA! MVP, which concluded the first phase of its work on 14 November 2023, addresses the following challenges faced by banks in extending SLLs:

Inaccurate settings for sustainability performance targets (SPTs) due to data scarcity and inconsistency

Greenwashing concerns, which the MAS estimates affect about 50% of SLLs

Inefficient processes leading to manual errors in reading and interpreting disclosures from lenders

The AI-powered MVP developed in phase one of Project NovA! offers three core features2 to address the above challenges:

Facilitate setting performance targets for SLLs in the real estate sector through peer and industry benchmarking: By harnessing data from government sources and conducting property-specific peer and industry comparisons, AI technology can be used to help banks set KPIs judiciously and establish practical SPTs to enable a more accurate sustainability assessment.

Monitor against selected KPIs/SPTs to curb greenwashing: By using buildings' energy consumption data continuously at source, NovA! enables banks to compare borrowers' current sustainability performance with the agreed SPTs in a timely manner. Risk assessment teams from banks can swiftly identify discrepancies, ensure SLLs maintain their intended impact, and curb greenwashing.

Enhance processing sustainable finance transactions through the Autonomous Documentation Insights Engine. This feature uses natural language processing to enable banks' relationship managers, know your client (KYC) teams and sustainable finance units to extract sustainability insights, such as a company's total GHG emissions, swiftly and accurately from diverse sources. This is a shift away from manual processing of disclosure documents, allowing for more informed decision-making based on comprehensive data extracted from borrower disclosures.

**Green Finance Industry Taskforce**

The MAS leads the finance industry Green Finance Industry Taskforce, which issued the finalized [Singapore Asia Taxonomy](https://www.mas.gov.sg/-/media/mas-media-library/development/sustainable-finance/singaporeasia-taxonomy-dec-2023.pdf) ("**Taxonomy**") in 2023. To promote green financing, funding and investment in Singapore and within the Association of Southeast Asian Nations, and to avoid unintended greenwashing, the Taxonomy uses science and technical screening to classify economic activities and projects as one of the following:

Green (environmentally sustainable)

Amber (transition, with the sunset date of 2030)

Ineligible

They are classified based on their contribution to at least one of the Taxonomy's five environmental objectives, while at the same time not causing any significant harm to the other four:

Climate change mitigation

Climate change adaptation

Protect healthy ecosystems and biodiversity

Promote resource resilience and circular economy

Pollution prevention and control

The MAS intends for market participants, such as asset owners, investment managers, financial institutions, issuers, policymakers, regulators and other stakeholders, to use the Taxonomy to identify and allocate capital to green and transition activities and projects.

The Taxonomy's standardized green eligibility criteria for Singapore-based real estate and construction activities uses the Green Mark: 2021 certification to evaluate a building's environmental impact and performance:

|  |  |  |
| --- | --- | --- |
| **Activities** | **Activity classification** | **Main technical screening criteria** |
| Construction of new buildings | Green | Prevailing Green Mark: 2021 certification, or office buildings (or portfolio) in Singapore meeting Climate Bonds Initiative (CBI) certification criteria  Eligible international certifications (e.g., Australia: Green Star Homes; China: Evaluation Standard for Green Building; India: India Green Building Council (IGBC) Green Homes; international: Leadership in Energy and Environmental Design (LEED) (Gold or Platinum), Excellence in Design for Greater Efficiencies (EDGE) or International Living Building Challenge Certified)  Certificate validity: five-year maximum limit if the certification does not impose a limit or has one that is longer than five years |
|  | Amber | No amber category for new buildings |
|  | Ineligible | Buildings are dedicated to extraction, storage, manufacturing, and transport of fossil fuels but do not include buildings providing office space to fossil fuel companies for administrative or trading activities. |
| Installation, maintenance, repair of equipment | Green | Complies with one of the following criteria:   * Installation of renewable energy equipment, renewable energy charging stations and regulation devices * Installation of equipment within the two highest energy efficiency classes for equipment, as determined by the relevant international labeling scheme or Singapore regulation |
|  | Amber | No amber category: Technology is sufficiently developed to meet green criteria |
|  | Ineligible | Buildings are dedicated to extraction, storage, manufacturing, and transport of fossil fuels but do not include buildings providing office space to fossil fuel companies for administrative or trading activities. |
| Renovation of existing buildings | Green | Complies with one of the following criteria:   * The renovations enable the building to reach the prevailing Green Mark: 2021 certification * The renovations are aligned with relevant CBI buildings criteria |
|  | Amber | Minimum 30% reduction in emissions or energy consumption if not meeting the certification standard above (based on energy usage, primary energy demand (PED) or GHG emissions) up to the 2030 sunset date |
|  | Ineligible | Buildings are dedicated to extraction, storage, manufacturing, and transport of fossil fuels but do not include buildings providing office space to fossil fuel companies for administrative or trading activities. |
| Acquisition or ownership of buildings | Green | Complies with one of the following criteria:   * Prevailing Green Mark: 2021 certification * The building is within the top 15% of the national (using the Annual Building Energy Benchmarking Report (BEBR)) or regional building stock expressed as operational PED or GHG emissions or energy consumption and demonstrated by evidence that at least compares the performance of the relevant asset to the performance of the national or regional stock and at least distinguishes between residential and nonresidential buildings. |
|  | Amber | The building is within the top 25% of the national BEBR or regional building stock expressed as operational PED or GHG emissions or energy consumption and demonstrated by evidence. The sunset date for this activity is 2030. |
|  | Ineligible | Buildings are dedicated to extraction, storage, manufacturing and transport of fossil fuels but do not include buildings providing office space to fossil fuel companies for administrative or trading activities. |

Public "green" financing initiatives

[Please refer to BE Transformation GFA Scheme and GMIS-EB 2.0 above.]

[1] See the MAS media release: [MAS-Led Consortium Develops AI-Powered System to Support Sustainable Finance in Real Estate Sector](https://www.mas.gov.sg/news/media-releases/2023/ai-powered-system-to-support-sustainable-finance-in-real-estate-sector); 14 November 2023.

[2] [NovA! A whitepaper on accelerating sustainability with AI November 2023](https://www.mas.gov.sg/-/media/project-nova-whitepaper.pdf).

# Planning

## Is the national or local/state government able to mandate green initiatives via the planning/zoning regime (e.g., district heating systems on large developments)?

The MND, together with the URA, is responsible for identifying infrastructure for upgrading and optimizing land use, but may also appoint a district-wide master developer to oversee the development of areas such as related industry clusters and new growth areas. In addition to imposing planning controls on individual land parcels, the master developer is given the discretion to develop the district based on land use and GPR guidelines at the overall district level to achieve: One of these master developers is JTC.

Optimized land use across the entire development

Integration of different users' needs

Planned district-wide systems such as district cooling to reduce energy usage and enhance the sustainability and attractiveness of the environment1

For land sold after 30 June 2022 under the GLS and Industrial Land Sales programmes for private development, the [Building Control (Buildability and Productivity) Regulations 2011](https://sso.agc.gov.sg/SL/BCA1989-S199-2011?DocDate=20231006) and the 2008 Regulations were amended in 2022 to impose several new requirements, including the requirement to attain the higher Green Mark certification rating of Platinum SLE to ensure the minimum energy efficiency improvement of 60% over the 2005 baseline. Previously, the 2008 Regulations stipulated the GoldPLUS or Platinum rating. Additionally, the environmental performance of buildings developed on GLS sites will be assessed on the Green Mark: 2021 certification standard and will be required to attain the maintainability badge to meet the Platinum SLE rating.2

The [District Cooling Act 2001](https://sso.agc.gov.sg/Act/DCA2001) allows minister for trade and industry to declare,3 by notification in the Government Gazette, an area to be a service area where district cooling systems (DCS) are to be provided and consumers have to subscribe to the service.

Unlike the in-house air-conditioning system in each individual building, which is maintained and operated, in part or fully, by a third party, the DCS supplies chilled water from a central source to multiple buildings through a network of pipes for cooling purposes. Individual users purchase chilled water from the DCS operator and do not need to install their own chiller plant other than an air distribution system.4

Drawing from the successful implementation in Yokohama and Osaka, Japan, which found that a DCS should serve a total gross floor area of about 1.25 million m2 for optimal efficiency,5 the URA has parceled out a section of the New Downtown at Marina South for a pilot DCS6 (expanded in 2023 with satellite plants7) and another in the upcoming Tengah development.8 The District Cooling Act 2001 and provision of DCS is administered by the Energy Market Authority of Singapore. SP Group, Singapore's national grid operator, which owns and operates electricity and gas transmission and distribution businesses including DCS, has also built and operated an industrial DCS at AMK Industrial Park.9

[1] Budget 2017; [speech by MND](https://sprs.parl.gov.sg/search/#/sprs3topic?reportid=budget-946); 7 March 2017.

[2] See the BCA circular: [Enhanced Minimum Requirements for Building Works Relating to any Building on Land Sold on or after 30 June 2022 under the Government Land Sales Programme](https://corenet.gov.sg/media/2330870/industry-circular-for-enhanced-reqmts-for-gls-site-final-30-june-2022.pdf); 30 June 2022.

[3] Section 7(1) of the District Cooling Act 2001.

[4] See the BCA [Green Mark: 2021 EE Technical Guide](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/20210909_energy-technical-guide_r1.pdf).

[5] [Second reading of the District Cooling Bill](https://sprs.parl.gov.sg/search/#/topic?reportid=013_20010316_S0002_T0004); 16 March 2001.

[6] [District Cooling (Declaration of Service Area) Notification](https://sso.agc.gov.sg/SL/DCA2001-N1?DocDate=20140917).

[7] SP Group news release: [SP Group Expands Marina Bay District Cooling Network With More Developments And New Satellite Plants](https://www.spgroup.com.sg/about-us/media-resources/news-and-media-releases/SP-Group-Expands-Marina-Bay-District-Cooling-Network-With-More-Developments-And-New-Satellite-Plants); 26 May 2023.

[8] Minister for trade and industry: [Second of the Energy (Resilience Measures and Miscellaneous Amendments) Bill](https://sprs.parl.gov.sg/search/#/sprs3topic?reportid=bill-545); 2 November 2021.

[9] See SP Group: [STMicroelectronics AMK Industrial Park, Singapore](https://www.spgroup.com.sg/sustainable-energy-solutions/our-partners/stmicroelectronics-amk-industrial-park-district-cooling-system-network-case-study).

# Green Leases

## Are green leases or green lease provisions mandatory or optional? If mandatory, to whom do they apply? If optional, is there significant take up?

The BCA has created a Green Lease toolkit,1 the second version updated and aligned with Green Mark: 2021, with a single schedule of Green Clauses (Green Schedule) applicable for all nonresidential building typologies to help landlords and tenants to work together to improve their environmental performance over the life of the building that they manage or occupy. The Green Schedule provides a list of standard clauses that contain specific provisions for sustainable design and management as well as health and well-being.

Although adoption of Green Clauses is optional, a 2022 survey across Asia Pacific2 noted that up to 42% of occupiers and large developers have signed leases incorporating certain Green Clauses. The Green Schedule should be read in conjunction with the relevant BCA Green Mark criteria. Where the building features a Green Lease for its tenant-occupants that meets the BCA's prescriptions for Green Leases under the scheme, Green Mark points will be awarded accordingly; for example, where Green Lease implementation for tenants to ensure the targeted energy saving is achieved or to control lighting power density for tenanted areas.3 The base building itself must first achieve the following:

A Green Mark GoldPLUS or Platinum rating

The Public Utilities Board's Water Efficient Building (Basic) Certification4

The Green Mark: 2021 score sheets also provide a maximum of available points under the whole life carbon section for fit-outs:

|  |  |
| --- | --- |
| CN3.1: Green Lease | Available points for the following:   * [New nonresidential building](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/green-mark-2021_scoresheet-(nrb)_r2.xlsx?sfvrsn=76e05737_0) * [Existing nonresidential building](https://www1.bca.gov.sg/docs/default-source/bca-awards-2020/green-mark-2021_scoresheet-(enrb).xlsx?sfvrsn=be6b146d_0) |
| A comprehensive Green Lease (or equivalent) to be incorporated into the tenancy agreement, which establishes agreed levels of environmental performance between the landlord and tenant for the following:  (a) More than or equal to 50% of the net lettable area  (b) More than or equal to 70% of the net lettable area  (c) Every tenant | One point for (a)  Two points for (b)  Three points for (c) |

Building owners5 in a Green Lease partnership programme with their commercial tenants may also apply for the Green Mark Pearl rating,6 which recognizes building owners/landlords and tenants/occupants working to achieve greater environmental sustainability for the same building.

The BCA describes this environmentally friendly leasing arrangement or "Green Lease" as an agreement between landlord and tenant that sets out environmental objectives on how the building is to be improved, managed and/or occupied in a sustainable manner. Any cost savings in energy and water can be shared among parties and provide a better indoor environment.

The Green Lease acknowledges that there are areas of cooperation between building owners and tenants (and any relevant service providers and contractors) and addressing traditional structural barriers to implementation, such as split incentives and interests between building owners and tenants, ensures that the parties with influence over key aspects of environmental performance obtain some benefit from implementing the improvements. For example, installing energy-efficient lighting that generates less heat has the following benefits:

The landlord benefits from reduced overall air-conditioning energy consumption.

The tenant benefits from the reduced energy bill for lighting usage.

The Green Lease improves transparency and accountability through providing an agreement between both landlord and tenant ensuring that the parties identify and address problems promptly and efficiently together.

The Green Schedule provides a list of standard clauses that contain specific provisions for sustainable design and management as well as health and well-being. This includes monitoring and improving energy efficiency, water efficiency, sustainable material, waste management, indoor environmental quality, and comfort and well-being of the users and occupants. Through a target/outcome-based approach, the Green Schedule applies to building landlords and tenants. These standard provisions are fully editable to suit an individual building typology's or individual tenant's context.

This schedule can form part of a memorandum of understanding, or part of the tenancy agreement between the building landlord and individual tenants, to ensure that the tenant's actions and operations do not negatively affect the overall building's sustainability performance and aspirations. The building landlords should put in place mechanisms/processes for the management, validation and remedial actions/penalties for noncompliance, laid out in a transparent manner and agreed by the tenant. A building management committee comprising representatives of the landlord and tenant(s) must be formed (and should meet at least twice annually) and will be responsible for developing and implementing the environmental objectives under the Green Lease, and monitoring the building's performance and reporting periodically on the outcomes.

**Drafting considerations for a Green Lease**

When preparing a Green Lease, building owners should consider which categories of provisions in the Green Schedule should be made mandatory and which may be designated as best practices to be performed by the tenants on a best-endeavors basis.

Building owners should also take into account the length of tenancy before specifying certain obligations as mandatory, the noncompliance of which will constitute a breach of lease. While short-term tenants may be deterred by the additional costs in mandating compliance with sustainability obligations, these terms may instead be drafted guidelines or non-binding undertakings and be made more palatable by the provision of incentives for compliance.

**Information sharing and submission/disclosure**

To support the Green Schedule obligations to meet annual targets for carbon emissions, energy, water and waste reduction and to demonstrate these with tangible results, building owners require tenants to share information on energy and water use and the quantum of waste and emissions generated.

Green Lease provisions should cover the scope of data to collect, the frequency of submission and the installation of meters to track this information.

Where the building owner is required to submit data for a certification assessment or to report on and disclose energy use and emissions, the building owner should provide for tenant consent to avoid issues of confidentiality, and clearly state the extent of information required, the purpose for sharing the information and the third parties the information will be disclosed to.

[1] See the BCA: [Green Lease Toolkit: Green Schedule; part of Green Mark: 2021](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/20210917_green-lease-toolkit_upload.docx?sfvrsn=a94a4e7d_2).

[2] JLL [Green Leases: Setting the Tone for Responsible Leases](https://www.jll.com.sg/en/trends-and-insights/research/green-leases-setting-the-tone-for-responsible-leases); 30 September 2022.

[3] [BCA Awards 2020: Green Mark Award](https://www1.bca.gov.sg/docs/default-source/bca-awards-2020/green-mark-awards-2020-ebooklet.pdf).

[4] See the BCA: [Green Lease Toolkit: Green Schedule; part of Green Mark: 2021](https://www1.bca.gov.sg/docs/default-source/docs-corp-buildsg/sustainability/20210917_green-lease-toolkit_upload.docx?sfvrsn=a94a4e7d_2).

[5] City Developments Limited: [Manufactured Capital: Green Leases](https://cdlsustainability.com/cdl-six-capitals/manufactured-capital/green-leases/).

[6] The BCA [Green Mark Pearl Award](https://www1.bca.gov.sg/buildsg/bca-awards/past-bca-awards/bca-green-mark-awards/bca-green-mark-pearl-award).

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